



Earth's Energy Sources

Pre-assessment activity from *The Science of Global Atmospheric Change Teacher's Guide*
and for *Mr. Slaptail's Curious Contraption*

Written by

Nancy P. Moreno Ph.D.

Barbara Z. Tharp, M.S.

Judith Dresden, M.S.

BioEdSM

Teacher Resources from the
Center for Educational Outreach at
Baylor College of Medicine

© 2012 Baylor College of Medicine. This activity is part of The Science of Global Atmospheric Change unit. *The Science of Global Atmospheric Change Teacher's Guide* may be used alone or with integrated unit components. The Global unit is comprised of the guide, *Mr. Slaptail's Curious Contraption* student storybook, *Explorations* magazine, and two supplements: *The Reading Link* and *The Math Link*. For more information on this and other educational programs, contact the Center for Educational Outreach at 713-798-8200, 800-798-8244, or visit www.bcm.edu/edoutreach.

© 2012 by Baylor College of Medicine. All rights reserved.
Third edition. First edition published 1998.
Printed in the United States of America

ISBN: 978-1-888997-75-0

BioEdSM

Teacher Resources from the Center for Educational Outreach at Baylor College of Medicine.

The mark “BioEd” is a service mark of Baylor College of Medicine. The mark “My Health My World” is a trademark of Baylor College of Medicine.

No part of this book may be reproduced by any mechanical, photographic or electronic process, or in the form of an audio recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use without prior written permission of the publisher. Black-line masters may be photocopied for classroom use.

The activities described in this book are intended for school-age children under direct supervision of adults. The authors and Baylor College of Medicine cannot be responsible for any accidents or injuries that may result from conduct of the activities, from not specifically following directions, or from ignoring cautions contained in the text.

Development of this unit was supported, in part, by grant numbers R25 ES06932 and R25 ES010698 from the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH). The opinions, findings and conclusions expressed in this publication are solely those of the authors and do not necessarily reflect the official views of Baylor College of Medicine, NIEHS or NIH.

Authors: Nancy P. Moreno, Ph.D., Barbara Z. Tharp, M.S., and Judith H. Dresden, M.S.
Editor: James P. Denk, M.A.
Designer and Illustrator: Martha S. Young, B.F.A.

ACKNOWLEDGMENTS

The Science of Global Atmospheric Change educational materials, first developed as part of the My Health My World® project at Baylor College of Medicine, have benefited from the vision and expertise of scientists and educators representing a wide range of specialties. Our heartfelt appreciation goes to Michael Lieberman, M.D., Ph.D., William A. Thomson, Ph.D., and Carlos Vallbona, M.D., who have lent their support and expertise to the project.

Special acknowledgment is due to our original partners in this project, the Texas Medical Association and the American Physiological Society (APS). We especially thank Marsha Lakes Matyas, Ph.D., of APS, for her direction of field test activities and ongoing collaboration.

Several colleagues provided valuable assistance during the development of this guide. In particular, we would like to thank Cassius Bordelon, Ph.D., Ronald Sass, Ph.D., Sandra Saunders, M.A., Lief Sigren, Ph.D., and Ellison Wittels, M.D.

Special thanks go to the National Institute of Environmental Health Sciences, Allen Dearry, Ph.D., Frederick Tyson, Ph.D., and Liam O’Fallon for their support of the My Health My World project and the related Environment as a Context for Opportunities in Schools (ECOS) project.

We are especially grateful to the many classroom teachers in Washington, D.C., and Houston and Austin, Texas, who participated in the field tests of these materials and provided invaluable feedback.

BCM
Baylor College of Medicine

Center for Educational Outreach
Baylor College of Medicine
One Baylor Plaza, BCM411
Houston, Texas 77030
713-798-8200 | 800-798-8244 | edoutreach@bcm.edu
www.bcm.edu/edoutreach | www.bioedonline.org | www.k8science.org

SOURCE URLS

BAYLOR COLLEGE OF MEDICINE

www.bcm.edu

CENTER FOR DISEASE CONTROL AND PREVENTION

cdc.gov/climatechange

KOEN VAN GORP - ASTRONOMY AND PHOTOGRAPHY

www.koenvangorp.be/events/eclipse_2006.html

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

ipcc.ch

NASA EARTH OBSERVATORY

earthobservatory.nasa.gov

NASA’S EYES ON THE EARTH

climate.nasa.gov

NATIONAL ACADEMIES OF SCIENCES

dels.nas.edu/Climate/Climate-Change/Reports-Academies-Findings

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

niehs.nih.gov/about/od/programs/climatechange

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, CLIMATE SERVICES

climate.gov/#education

NATIONAL PARK SERVICE, CLIMATE CHANGE RESPONSE PROGRAM

nature.nps.gov/climatechange

DAVID SHAND

www.flickr.com/photos/14508691@N08/with/5187817955/

TAU’OLUNGA

http://en.wikipedia.org/wiki/File:North_season.jpg

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

sis.nlm.nih.gov/enviro/climatechange.html

U.S. GEOLOGICAL SURVEY, OFFICE OF GLOBAL CHANGE

usgs.gov/global_change

U.S. GLOBAL CHANGE RESEARCH PROGRAM

globalchange.gov

GRAY WATSON

http://en.wikipedia.org/wiki/File:Solar_panels_on_house_roof.jpg

ALAN E. WHEALS, PH.D., UNIVERSITY OF BATH

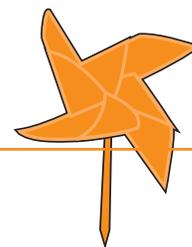
<http://www.bath.ac.uk/bio-sci/research/profiles/wheals-a.html>

WORLD HEALTH ORGANIZATION

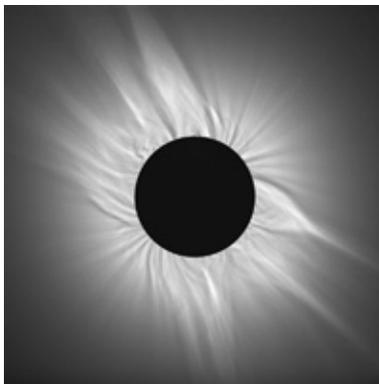
who.int/global-change/environment

Earth's Energy Sources

Pre-assessment



Global warming, ozone depletion, skin cancer risk... all of these themes appear frequently in the news. Yet, there are many misconceptions about them. This unit allows students to explore the science behind energy use and changes in the atmosphere. At the same time, students learn basic physical and earth/space science concepts related to light and electromagnetic radiation, the atmosphere, fossil fuels and combustion. Students also learn about the carbon cycle, the role of carbon dioxide in living systems and the important role of skin in protecting living organisms. Finally, students have opportunities to integrate their knowledge through explorations about the greenhouse effect, climate and alternative energy sources. Overviews of the science content covered in each section of this guide can be found in the one-page Physical Science, Life Science, and Environment and Health Basics overviews. The introduction to each activity also provides a summary of science concepts covered.



This pre-assessment is designed to allow you, the teacher, to estimate students' existing knowledge about these topics before beginning the unit. It also can be used for self-assessment by students once the unit is completed.

SETUP

Have students work individually to complete the pre-assessment.

PROCEDURE

1. Initiate a class discussion about sources of energy and energy use. Ask questions such as, *What is the source of energy for your family's car? What about for your computer? Where does the energy we need come from?* To build awareness, have students make a class list of the many different ways in which they rely on energy each day.
2. Follow by asking, *Do you think our uses of energy affect the environment?* Tell students that they will find answers to these and other questions over the next few weeks.
2. Give each student a copy of the pre-assessment. Have students complete the pre-assessments individually. Tell students that they will not be graded. Rather, they will use the pre-assessments to gauge how much they have learned over the course of the unit.
3. Collect completed pre-assessments and save them. Students will refer back to their answers at the conclusion of the unit.

CONCEPTS

- Allows teacher to estimate students' prior knowledge related to the atmosphere, carbon cycle, skin and skin cancer risk, and climate change.

OVERVIEW

Unit pre-assessment designed for use with students before beginning any unit activities. Will be revisited as part of Activity 11.

TIME

Preparation: 5 minutes
Class: 30 minutes

MATERIALS

Each student will need:

- Copy of "Do You Know" student sheet (p. 2–3)

GLOBAL CHANGE

Global atmospheric change affects ecosystems, water, energy, transportation, agriculture and human health. The impacts differ from region to region and will grow under projected climate change.

Source: U.S. Global Change Research Program.

ANSWER KEY

- | | |
|------|-------|
| 1. b | 6. a |
| 2. c | 7. c |
| 3. b | 8. d |
| 4. d | 9. c |
| 5. a | 10. a |





Do You Know?

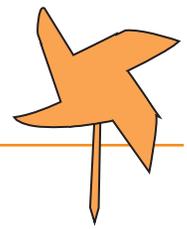
Name _____

Circle the letter beside the correct answer to each question below.

- Where are fossil fuels found?
 - In a Geomuffin
 - Underground
 - In a tree
 - In the atmosphere
- Why is your skin important?
 - It sends messages to the circulatory system.
 - It can get sunburned.
 - It helps keep germs out of the body.
 - It has no layers.
- What is the source of almost all energy on Earth?
 - The moon
 - The sun
 - Electricity
 - The water cycle
- Most air pollution is found in which layer of the atmosphere?
 - Thermosphere
 - Mesosphere
 - Stratosphere
 - Troposphere
- Which of the following contains carbon?
 - Sugar
 - Water
 - Spoon
 - Glass
- Which answer about greenhouse gases is not true?
 - They are present in large amounts in the atmosphere.
 - They are produced by things people do.
 - We can't see them.
 - They help trap heat in the atmosphere.
- Which of the following zones has a climate with warm temperatures year-round?
 - Polar
 - Temperate
 - Tropical
 - Desert
- How could you estimate how much skin an orange has?
 - Squeeze out the juice.
 - Use the Law of Nines.
 - Make a rectangle.
 - Peel it and lay the skin out flat.
- A rainbow is made of:
 - tiny colored specks.
 - microwaves.
 - wavelengths of light.
 - a prism.
- When should a person wear sunscreen?
 - Every day
 - Only if a person gets sunburned easily
 - Only at the beach
 - Only if it is hot outside



Mide Tu Conocimiento



Mi Nombre _____

Haz un círculo alrededor de la letra que corresponde a la mejor respuesta.

- ¿Donde se encuentran los combustibles fósiles?
 - En un Bizcocho Geológico
 - Bajo tierra
 - En un árbol
 - En la atmósfera
- ¿Porque es importante la piel?
 - Envia mensajes al sistema circulatorio.
 - Puede quemarse con el sol.
 - Ayuda a mantener los gérmenes fuera del cuerpo.
 - No tiene capas.
- ¿De donde proviene casi toda la energía en la Tierra?
 - La luna
 - El sol
 - La electricidad
 - El ciclo del agua
- ¿Cual capa de la atmósfera tiene más contaminación?
 - Termósfera
 - Mesófera
 - Estratósfera
 - Tropósfera
- ¿Donde se puede encontrar el carbón?
 - En el azucar
 - En el agua
 - En una cuchara
 - En un vaso
- ¿Cual es la respuesta incorrecta acerca de los gases de invernadero?
 - Se encuentran en grandes cantidades en la atmósfera.
 - Se producen por medio de acciones humanas.
 - No los podemos ver.
 - Ayudan a atrapar el calor en la atmósfera.
- ¿Cual zona tiene un clima con temperaturas cálidas durante todo el año?
 - La zona polar
 - La zona templada
 - La zona tropical
 - El desierto
- ¿Como podrías estimar la cantidad de piel cubriendo una naranja?
 - Exprimir todo el jugo.
 - Usar la regla de los nueve.
 - Hacer un rectángulo.
 - Pelar la naranja y extender la piel sobre una superficie plana.
- Un arcoíris se hace de:
 - unos puntitos de colores.
 - las microondas.
 - diferentes longitudes de onda de la luz.
 - un prisma.
- Los fotoprotectores deben aplicarse:
 - todos los días.
 - tan solo si alguien se quema facilmente del sol.
 - tan solo en la playa.
 - tan solo si hace calor afuera.

